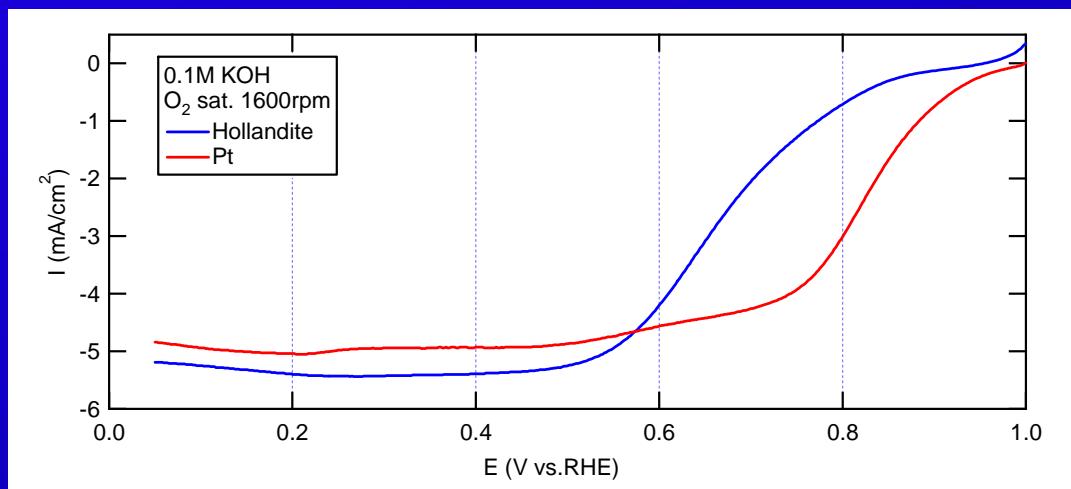


Design of Pt-Free Complex Metal Oxide Electrocatalysts for Oxygen Reduction Reactions in Fuel Cells

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While fuel cells provide a much more efficient way of utilizing the energy stored in chemical fuel than traditional combustion routes, their viability is limited by the high costs and limited availability of the noble metal catalysts like platinum that are routinely used at their electrodes.

New classes of transition metal oxides are being investigated for their potential utility as fuel cell oxygen reduction reaction (ORR) catalysts, with the goal of developing more active, less expensive, and acid-stable alternatives to current noble metal systems. Furthermore, we are investigating whether these transition metal oxides can lower the large overpotential typically necessary for the oxygen reduction reaction, providing enhancements in fuel cell efficiencies.



In addition to finding a number of new materials with ORR activity in acidic solutions, we have found inexpensive ceramic systems with an activity in basic media that is only a little lower than that of platinum. Investigations into the reaction mechanism of these new materials are underway.